

Student Name:

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University of Bahrain

College of Information Technology
Department of Computer Science

ITCS332: Organization of Programming Languages

Quiz#2: Chapter 3_Syntax

QUESTION 1: Construct the BNF rules to define the **print** statement. A **print** statement is a keyword **print** followed by the insertion operator **<<** followed by one or more expressions by colons **:** and terminated by **#**. An expression may be one or more variables or constants.

Examples of accepted **print** statements: **print << <var>:<const>:<const> #**
print << <const> #
print << <var> # {4 pts}

<print> → **print << <exprs> #**
<exprs> → **<expr> | <expr> : <exprs>**
<expr> → **<const> | <var>**

QUESTION 2: Construct the BNF rules of a variable defined as a letter followed by zero or more digits/letters. {2 pts}

<var> → **<letter> | <var> <letter> | <var> <digit>**

QUESTION 3: Convert the following BNF rules into EBNF rule(s). {4 pts}

<read> → **read >> <ids> !**
<ids> → **<id> | <id> : <ids>**
<id> → **<letter> | <id> <letter> | <id> <digit>**

<read> → **read >> <id> { : <id> } !**
<id> → **<letter> { (<letter> | <digit>) }**

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QUESTION 1: Construct the BNF rules to define the **read** statement defined as follows. A **read**

statement is a keyword **read** followed by the extraction operator **>>** followed by one or more **identifiers** separated by **colons :** and terminated by **!**. An identifier is defined as a letter followed by zero or more digits or letters. Letters and digits are defined as follows:

<let> → A|B|C|...|Z|a|b|c|...|z

<dig> → 0|1|2|3|4|5|6|7|8|9.

{4 pts}

Examples of accepted **read** statements:

read >> quiz !

read >> t : row4 !

read >> d8 : h : b49d !

<read> → read >> <ids> !

<ids> → <id> | <id> : <ids>

<id> → <let> | <id> <let> | <id> <dig>

QUESTION 2: Construct the BNF rules of a constant defined as a sequence of one or more Arabic

digits terminated by a hash symbol #. **<digit>** → 0|1|2|3|4|5|6|7|8|9. **{2 pts}**

<const> → <digits> #

<digits> → <digit> | <digit> <digits>

QUESTION 3: Given the following grammar:

<print> → print << <exprs> #

<exprs> → <expr> | <expr> : <exprs>

<expr> → <const> | <var>

Construct the parse tree of a sentence: **print >> <const> : <const> : <var> #** **{4 pts}**